Yaoyu Hu

1986.2, Male

Tel: +86 135 6448 6941
Email: huyaoyu@sjtu.edu.cn
Website: huyaoyu.com
Address: 800 Dongchuan Rd., Shanghai, China, 200240

Education

Shanghai Jiao Tong University — Ph.D. — 2017.3
Nuclear Science & Engineering

East China University of Science & Technology — B.S. — 2009.6
Mechanical Design, Manufacture & Automation

Research Interests

- Simulation and numerical analysis of robotic systems and environments.
- Mechanics modeling and analysis of micro/nano-robotics.
- CFD & FEM modeling of mechanical system, program development.
- Numerical solution of physical model. Numerical optimization.

Technical Skills

- **CFD & FEM:** Programming, parallel computing. Finite volume method, 3D unstructured grid, turbulent model. Thermo-hydro-mechanical interaction.
- **Programming:** C/C++, MATLAB, Python. Embedded system development.
- **Data visualization:** ROOT, VTK/ParaView, OpenSceneGraph.
- **Software:** ANSYS CFX, Fluent (UDF), APDL. COMSOL. MCS Patran, Nastran, Adams. OpenFOAM. Common CAD products.
- **Experiments:** Fluid visualization. Vibration measurement.

Competitions & Private Projects

- Service robot design (2016)

  Task: Embedded system design, sensory input processing, motion control.
- Quadrotor drone contest (2014)

  Task: Multi-tasking in Linux OS, flying control, task planning.
- RoboCup China Open (2013)

  Event: First Prize in Standard platform league of RoboCup soccer contest.

  Task: Software framework design and implementation.

Research Experiences

- **Thesis: Study on the Shields Clearance Flow and Its Rotordynamic Effects for Large Canned Motor Reactor Coolant Pump (2016)**
  Highlights: Computational Fluid Dynamics (CFD) code development, 3D finite volume method, turbulence model, parallel computing, C++/MATLAB/Python, runs on Linux. Fluid-induced forces measurement. Online vibration and rotor trajectory measurement.

- **Research on the Effects of Annular Flow on the Stability of the Rotordynamic System in Canned Motor RCP (2016)**
  Highlights: Flow visualization. Simultaneous measurement of the flow field and rotordynamic characteristics. Rotor trajectory test. Developing data acquisition and processing software using LabView and MATLAB.

- **Safety Analysis of a Main Feed Water Pump in the Second Loop of a Nuclear Power Plant (2015)**
  Task: CFD simulation of the hydraulic components and seals, rotordynamics analysis and finite element method (FEM) code development, seal-rotor coupled characteristics analysis, stress analysis of hydraulic components (with mechanical loads, flow induced loads and thermal loads).
  Pump performance experiment.

- **Structure and Safety Analysis of the Prototype Pump for Molten-Salt Reactor (2014)**
  Task: Rotordynamics analysis and code development, CFD simulation of seals, seal-rotor coupled analysis.
  Pump performance experiment. Measurements of modal frequency and temperature distribution.

- **Key Scientific Issues in the Manufacturing of Reactor Coolant Pump –**
  Sub-project: Safety assessment of the rotor components (2013)
  Task: Rotordynamic experiments, test of fluid-induced vibration.
  Rotordynamics and lubrication analysis. FEM and Finite difference method (FDM) code development.

- **Structure Safety Analysis and Physical Simulation of Reactor Coolant Pump (2011)**
  Task: Multi-body dynamics simulation based on mixed rigid-deformable bodies using MCS products (Patran, Nastran and Adams) .

- **Study of Physical Simulation Technology for the Canned Motor Pump in AP1000 System (2011)**
  Task: Programming of the 3D physical simulation (rigid-body dynamics) and visualization.

Publications

- **Leading author**

- **Hu Y**, Wang D, Yin J, et al. Numerical analysis of single pad of thrust bearing with the energy equation solved by the characteristic-based split method. *Advances in Mechanical Engineering*, 2015, 7(9): 1687814015606282.

- **Hu Y**, Wang D Z, Fu Y, et al. Numerical study on rotordynamic coefficients of the seal of molten salt pump. *Nuclear Science and Techniques*, 2016, 27(5): 114.

- **Hu Y**, Wang D, Wang Y, et al. Stability Analysis for Reactor Coolant Pump With Vertical Rotor Supported by Fluid Film Bearings. *2012 20th International Conference on Nuclear Engineering and the ASME 2012 Power Conference*. American Society of Mechanical Engineers, 2012: 67-74.

- **Hu Y**, Wang D, Yin J, et al. Numerical Analysis of Rotordynamic Coefficients of Annular Flow in Canned Motor RCP. *2014 22nd International Conference on Nuclear Engineering*. American Society of Mechanical Engineers, 2014: V001T03A018.
- **Hu Y**, Lin Y X, Wang D Z, Miu F M, Yin J L. Numerical Study on the Resistance Characteristics and Rotordynamic Coefficients of a Helically Grooved Annular Seal. *The 7th International Conference on Pumps and Fans, Hangzhou*, China October 18-21, 2015.
- **Coauthor**
- Long Y, Wang D, Yin J, **Hu Y**, Ran H. Numerical investigation on the unsteady characteristics of reactor coolant pumps with non-uniform inflow. *Nuclear Engineering and Design, 2017,* 320: 65-76.
- Long Y, Wang D, Yin J, **Hu Y**. Experimental investigation on the unsteady pressure pulsation of reactor coolant pumps with non-uniform inflow. *Annals of Nuclear Energy,* 2017, 110: 501-510.
- Wang Y, Wang D, Guo W, Yin J, **Hu Y**. The effect of smaller turbulent motions on heat transfer in the annular gap flow of flywheel. *Annals of Nuclear Energy*, 2016, 91: 1-7.
- Long Y, Yin J, Wang D, **Hu Y**. The Effect of the Channel Head on the Unsteady Pressure Pulsation Characteristics at the Inlet and Outlet of Reactor Coolant Pumps. *IOP Conference Series: Earth and Environmental Science*. Vol. 49. No. 3. IOP Publishing, 2016.
- Cheng H, Li H, Yin J, Gu X, **Hu Y,** Wang D. Investigation of the distortion suction flow on the performance of the canned nuclear coolant pump. *ISFMFE2014*, Wuhan, China.
- Wang Y, Wang D, Yin J, **Hu Y**. The Use of Experimental Design for the Shrink-Fit Assembly of Multi-Ring Flywheel. *2014 22nd International Conference on Nuclear Engineering*. American Society of Mechanical Engineers, 2014.
- Wang Y, Wang D, **Hu Y**. Vibration Analysis of Coolant Pump With Two Unbalanced Disks Based on the State-Space Newmark Method. *2012 20th International Conference on Nuclear Engineering and the ASME 2012 Power Conference*. American Society of Mechanical Engineers, 2012.